

WHAT IS CLAIMED IS:

1. An assay plate and electrode assembly comprising at least one sample well having electrodes placed therein, wherein said electrodes are positioned with respect to the bottom surface of the well to provide an electric field adjacent to said bottom surface that varies by less than about 10% from a mean field intensity over at least about 20% of the surface area of said bottom surface.

2. The assembly of Claim 1, wherein said electrodes comprise plate electrodes extending down into said well such that bottom ends of said electrodes are adjacent to but not in contact with said bottom surface.

3. The assembly of Claim 1, comprising two electrodes per sample well.

4. The assembly of Claim 1, comprising more than two electrodes per sample well.

5. The assembly of Claim 1, wherein said electrodes are plated onto said bottom surface of said well.

6. The assembly of Claim 1, wherein said bottom surface comprises a high optical transmittance portion.

7. The assembly of Claim 6, wherein said high transmittance portion is made from a material selected from the group consisting of glass, quartz, cycloolefin, Aclar, polypropylene, polyethylene and polystyrene.

8. The assembly of Claim 6, wherein said high transmittance portion exhibits less fluorescence when excited with UV light in the range of 250 nm to 400 nm than polystyrene.

9. The assembly of Claim 1, wherein said electrodes are located in a wall of said plurality of wells.

10. The assembly of Claim 1, wherein said plate comprises up to 96 wells.

11. The assembly of Claim 1, wherein said plate comprises greater than 96 wells.

12. The assembly of Claim 11, wherein said plate comprises greater than 384 wells.

13. The assembly of Claim 1, wherein said electrodes are made of a material selected from the group consisting of gold, platinum, palladium, chromium, molybdenum, iridium, tungsten, tantalum and titanium.

5 14. The assembly of Claim 1, wherein said electrodes are separated by a gap within the range of about 1 to 4 mm.

15. The assembly of Claim 1, wherein said electrodes are separated by a gap within the range of about 0.1 to 1 mm.

16. The assembly of Claim 1, wherein said electrodes are separated by a gap within the range of about 0.01 to 0.1 mm.

10 17. A bottom panel for a multi-well plate comprising:
at least one row of high transmittance regions with positions corresponding to well locations;

a first strip of conductive material extending along said row and overlapping a first portion of said well locations; and

15 a second strip of conductive material extending along said row and overlapping a second portion of said well locations.

18. The bottom panel of Claim 17, additionally comprising a first electrical contact proximate to an end of said first strip and a second electrical contact proximate to an end of said second strip.

20 19. An assay apparatus comprising:
a sample well;
a first pair of electrodes positioned within said sample well;
at least one additional satellite electrode positioned within said sample well.

25 20. The assay apparatus of Claim 19, wherein said at least one additional satellite electrode comprises second and third pairs of electrodes.

21. The assay apparatus of Claim 20, wherein said satellite electrodes are charged to a potential less than that of the first pair of electrodes.

30 22. The assay apparatus of Claim 19, wherein said electrodes are positioned with respect to the bottom surface of the well to provide an electric field adjacent to said

bottom surface that varies by less than about 10% from a mean field intensity over at least about 20% of the surface area of said bottom surface.